VERIFICATION OF TRANSLATION

Re: Japanese Application No. JP2003-048093

I, Takao Honya, , residing at Tsurukawa 5-11-23, Machida-shi, Tokyo, Japan 195-0061, hereby declare that I am the translator of the attached Japanese Application No. 2003-034618, and I certify to the best of my knowledge and belief that the following is a true translation made by me into the English language.

Executed at Minami Aoyama on this 26th day of December , 2003.

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JAPAN PATENT OFFICE

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[Object name] Abstract 1

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[Document name] Specification

[Title of The Invention] A coin hopper

[Claims]

[Claim 1]

A coin hopper comprises of;

a storing bowl (20) which stores coins (36) in bulk and includes a wall section (52, 54),

a rotating disk (16) which is located below the storing bowl (20) for the coins (36),

a moving wall section (60, 120, 122, 124, 126, 140) which structures the wall section of the storing bowl (20) and can move to a storing position (74) or to a providing position (76); the coins (36) do not slide towards the rotating disk (16) in the storing position however they so slide towards the rotating disk (16) in the providing position (76).

[Claim 2]

The coin hopper claimed in claim 1,

the moving wall sections (60, 120, 122, 124, 126, 140) are located around the rotating disk (16).

[Claim 3]

The coin hopper claimed in claim 2,

the moving wall section (60, 120, 122, 124, 126, 140) is a part of a bucket.

[Claim 4]

A coin hopper comprises of;

a storing bowl (20) which stores coins (36) in bulk and includes wall section (54) which slants downwards and towards a rotating disk (16),

a rotating disk (16) which is located below the storing bowl (20) for the coins (36) and lets off the coins (36),

a moving wall section (60, 120, 122, 124, 126, 140) which structures the wall section of the storing bowl (20) and can move to a storing position (74) or to a providing position (76);

the coins (36) do not slide towards the rotating disk (16) in the storing position however they do slide towards the rotating disk (16) in the providing position (76),

a coin amount detecting unit (80) which detects at a predetermined coin amount on the rotating disk (16) and outputs a refilling signal (86),

an actuator (70, 130, 142, 146) which operates the moving wall (60) from the storing position (74) to the providing position (76) based on the refilling signal (86).

[Claim 5]

The coin hopper claimed in claim 4,

the rotating disk (16) is driven by an electrical motor (18);
when the motor (10) rotates at a direction, the rotating disk (16) lets off the coins (36);
when the motor (10) rotates in the counter direction, the actuator is driven and the moving wall moves from the storing position (74) to the providing position (76).

[Detailed Description of the Invention]

[0001]

[Technical field to which the invention pertains]

This invention is related to a coin hopper which dispenses coins one by one which are stored in bulk and is used in a vending machine, an exchanging machine or a gaming machine. Especially, this invention is related to a coin hopper which does not increase the surface area in spite of the increased amount of the coins.

In this specification, "coin" is a generic name which may include a medal, a token or etc.

[0002]

[Description of the Prior Art]

The coin hopper is built in an exchanging machine, a vending machine or a gaming machine, and dispenses predetermined coins based on an instruction signal of the main controlling unit.

Therefore the coin hopper is built in a predetermined area in the machines.

A hopper includes a storing bowl which stores bulk coins, a rotating disk which slants and is located under the storing bowl, so that the coins are dispensed one by one by the rotating disk, and is known. (see Japanese Laid open utility model 6-43767).

[0003]

An other case is known that a storing section is located under the storing bowl which faces towards the slanted rotating disk for increasing the coin amount.

When the coin amount decrease on the rotating disk, a lifting unit which is located in the storing section transports the coins to the storing bowl. (see Japanese Laid open patent 2002-117428).

[0004]

[Problem(s) to be Solved by the Invention]

In the first case, when the storing coins are increased in the storing bowl, an extra bowl is located over the usual bowl.

In other words, the height of the coin hopper increases by the extra bowl.

Therefore it increases the surface area.

[0005]

In the second case, the coins are stored in a dead area which is located under the storing

bowl.
Therefore the storing coins can be increased when the put in area is the same.
However the lifting unit is newly needed, it is expensive and a large conversion is needed.
As a result, it's not easily done.
[0006]
The first purpose of this invention is for the string amount of the storing bowl is increased.
The second purpose of this invention is so that the surface area does not increased.
The third purpose of this invention is to make it simple and inexpensive.
The fourth purpose of this invention is to make it adapts from a used coin hopper.
[0007]
[Means for Solving the Problem]
This present invention has the following structure for solving the problems.
A coin hopper comprises of;
a storing bowl which stores coins in bulk and includes a wall section,
a rotating disk which is located below the storing bowl for the coins,
a moving wall section which structures the wall section of the storing bowl and can move to a storing position or to a providing position; the coins do not slide towards the rotating disk in the storing position however they so slide towards the rotating disk in the providing position.
[0008]
In this structure, at least a part of the storing bowl is made up of the moving wall.
When the coins are over a predetermined amount, the moving wall is kept in a storing position.
In the storing position, the coins on the moving wall do not slide onto the moving wall.
In other words, the moving wall slightly slants down towards the rotating disk or slants opposite.
[0009]
Therefore the capacity of the storing bowl increases.
As a result, the coin storing amount increases.
When the coin amount on the rotating disk is a predetermined amount, the moving wall is moved to the providing position.
The coins on the moving wall slide and fall down onto the rotating disk.
Afterwards, the coins are dispensed one by one.
Therefore the storing amount of the storing bowl increases and the selectively moveable

wall is simple.
When the prior coin bowl is converted, the changed part is only the storing bowl with the moving wall.
Therefore the convert is inexpensive.
[0010]
The present invention is desirable, because the moving wall section is located around the rotating disk and is plural.
In this structure, the plural moving walls are located around the rotating disk, therefore the storing amount is drastically increased.
[0011]
The present invention is desirable, because the moving wall section is a part of the bucket.
When the bucket is lifted up, the stored coins in the bucket do not have contact with the fixed wall.
Therefore the coins are not lodged by the moving wall and the fixed wall.
The coins can slide smoothly onto the rotating disk.
[0012]
The present invention is desirable, because a coin hopper comprises of;
a storing bowl which stores coins in bulk and includes wall section which slants downwards and toward the rotating disk,
a rotating disk which is located below the storing bowl for the coins and lets off the coins,
a moving wall section which structures the wall section of the storing bowl and can move to a storing position or to a providing position;
the coins can not slide towards the rotating disk at the standby position and can slide towards the rotating disk at the providing position,
a coin amount detecting unit which detects at a predetermined coin amount on the rotating disk and outputs a refilling signal,
an actuator which operates the moving wall from the storing position to the providing position based on the refilling signal.
[0013]
In this structure, the storing bowl is structured by the fixed wall and the moving wall which is a part of the fixed wall.
The coins can slide down toward the rotating disk on the fixed wall.
When the coins are stored at a predetermined amount in the storing bowl, the moving wall is kept at the storing position.

At the storing position, the moving wall is kept in the situation where the coins can not slide towards the rotating disk.

[0014]

In other words, the moving wall slightly slants downwards and towards the rotating disk or the opposite.

Therefore the capacity of the storing bowl increases and the storing amount increases.

The moving wall is located under the fixed wall which in other coin hoppers is wasted space.

As a result, the coin hopper does not become larger.

[0015]

When the coin's amount is at a predetermined amount, the actuator is operated and the moving wall is moved to the providing position.

The coins on the moving wall slide down onto the rotating disk.

Therefore the slid coins are dispensed one by one by the rotating disk.

As a result, the dispensing amount of the coin increases.

[0016]

The present invention is desirable, because the rotating disk is driven by an electrical motor;

when the motor rotates in a direction, the rotating disk lets off the coins;

when the motor rotates at a counterclockwise direction, the actuator is driven and the moving wall moves from the storing position to the providing position.

[0017]

In this structure, the rotating disk is rotated to a direction by the electrical motor and dispenses the coins.

On the other hand, the actuator is driven by the opposite rotation of the electrical motor and the moving wall is moved to the providing position.

Therefore the coins on the moving wall slide down onto the rotating disk.

As a result the electrical motor is only one and can drive the rotating disk and the moving wall and is inexpensive.

[0018]

[Embodiments of the Invention]

Fig. 1 is a perspective view of the coin hopper of the first embodiment.

Fig. 2 is a cross section view of A plane of Fig. 1. Fig. 3 is a perspective view of the bucket of the first embodiment.

Fig. 4 is a controlling block diagram of the actuator of the first embodiment.

Fig. 5 is a driving system diagram of the second embodiment.

Fig. 6 is a plane view of the third embodiment.

Fig. 7 is a cross section view of B - B line of Fig. 6.

Fig. 8 is an explaining view of fourth embodiment.

Fig. 9 is an explaining view of fifth embodiment.

[0019]

Hopper 10 includes frame 12, base 14, rotating disk 16, electrical motor 18 and storing bowl 20.

Frame 12 is a box like in shape and the upper surface 22 slants approximately at 30 degrees to surface 22.

Base plate 24 is rectangular and is fixed at upper surface 22.

Therefore base plate 24 slants approximately at 30 degrees.

The lower section of storing bowl 20 is fixed on base plate 24.

[0020]

Attaching concave 26 is a circular form and is located at the center of base plate 24, and bottom 28 is flat.

Rotating disk 16 is located in concave 26 and has a cone-shaped projection 30 which is located at the center and has a few through holes which are located at an equal distance and at around the projection 30.

[0021]

The upper section (the upper surface of rotating disc 16) of through hole 32 is a cone-shaped hollow for going into the through hole 32 easier.

As shown in figure 2, outputting shaft 42 of reducer 40 is inserted into shaft hole 38 of the projection 30 of rotating disk 16.

A friction transmitting unit (not shown) is located between outputting shaft 42 and rotating disk 16, the rotating disk 16 is driven through the friction transmitting unit by the outputting shaft 42.

[0022]

Reducer 40 is fixed at the reverse side of base plate 24 by a fixing means (not shown).

Motor 18 is fixed at reducer 40, and drives rotating disk 16 through reducer 40 and outputting shaft 42 and the friction transmitting unit.

[0023]

Next, storing bowl 20 is explained.

Storing bowl 20 is cylinder and has upper section 44 which is a rectangular tube section and the upper end is opened upwards horizontally and is throwing opening 46.

Outlet 50 of the lower inner section 48 is cone-shaped and slants as the same to base plate

24.

[0024]

The lower end of storing bowl 20 is fixed on the upper surface of base plate 24.

In this situation, outlet 50 is located over rotating disk 16.

Rotating disk 16 can be located in exit 50 of lower section 48 of storing bowl 20.

Therefore "rotating disk 16 which is located at the lower section of storing bowl" includes that the rotating disc is located in or below the exit 50.

[0025]

Storing bowl 20 includes perpendicular wall section 52 which extends downward from throwing opening 46 and middle wall section 54 which extends downward towards rotating disk 16.

Middle wall section 54 slants as the coins on the middle wall section slide down towards rotating disk 36.

Perpendicular wall 52 and middle wall 54 is a fixed wall, because they are fixed at base plate 24 and can not move.

[0026]

Next moving wall section 60 is explained.

Moving wall 60 is located at the middle wall section which is the fixed wall section around rotating disk 16.

As shown in figure 3, moving wall section 60 is a part of bucket 62.

Bucket 62 includes bottom wall 64, side walls 66, 68 which are located at the left and right side of the bottom wall 64 and periphery wall 69 which is located between side wall 66 and 68.

Moving wall 60 is bottom wall 64.

[0027]

Bucket 62 can pivot on shaft 72 which is located at the base of sector side walls 66, 68 and is located at middle wall section 54 which is located at the slanting direction of rotating disk 16.

In other words, bucket 62 is fitted in attaching opening 74 which is rectangle and is located at middle wall section 54 and is pivotable.

Periphery wall 69 is arc shape which is center at shaft 72.

Bucket 62 is selectively moved by an after-mentioned actuator to storing position 74 which is a solid line and providing section 76 which is the dotted line as shown in figure 2.

[0028]

Therefore at storing position 74, moving wall section 60 is kept at a situation that coins 36 on moving wall section 60 do not slide.

In other words, as shown in figure 2, the moving wall section 60 slants parallel to the rotating disk 16.
Also, moving wall section 60 slants towards at the same direction, however the coins 36 do not slide towards the rotating disk 16.
It is desirable when the moving wall section 60 slants more than rotating disk 16, because the storing amount increases drastically.
[0029]
At providing position 76, moving wall section 60 slants downwards towards rotating disk 16; also coins 36 on the moving section 60 can slide towards rotating disk 16.
Moving wall section 60 is located at middle wall section 54.
Therefore the section is usefully used because the section is a dead area in the prior art.
Accordingly, coins 36 fall down onto rotating disk 16 by sliding on middle wall section 54 and are dispensed.
[0030]
Next, actuator 70 moves moving wall section 60 and is explained referring to figure 2.
In this embodiment, actuator 70 is screw jack 71.
Stationary section 72 builds in a worm gear and a worm wheel and pivots on shaft 75 which is fixed at the upper surface of base 14.
Electrical motor 73 with a reducer is fixed at stationary section 72 and drives the worm gear.
[0031]
Moving section 77 is inserted into stationary section 72 and can move into or out off the stationary section 72 based on the rotating direction of the worm wheel.
The end of moving section 77 can pivot on shaft 79 which is fixed at moving wall section 60.
When screw jack 71 is short, moving wall section 60 is located at storing position 74.
When screw jack 74 is long, moving wall 60 is located at providing position 74.
[0032]
Actuator 70 can use an air cylinder, an oil-cylinder, a liner-motor etc.
In other words, actuator 70 has a function that can selectively move moving wall section 60 to storing position 74 or providing section 76.
When the coin's amount in storing bowl 20 becomes at a predetermined amount, actuator 70 is operated.
In other words, when the coins 36 on rotating disk 16 are not detected by coin amount detecting unit 80, actuator 70 is operated.
[0033]

Next, coin amount detecting unit 80 is explained.

Coin amount detecting unit 80 includes first electrode 82 and second electrode 84 which are put in middle wall surface 54 and have a predetermined distance over outlet 50 of storing bowl 20.

When the coin's amount on rotating disk 16 reduces, the current does not flow between first electrode 82 and second electrode 84.

Therefore refilling signal 86 is outputted by refilling direction circuit 88.

[0034]

Refilling direction circuit 88 opens and shuts switching circuit 92 which is located between power source 90 and electric motor 73.

When switching circuit 92 receives coin refilling signal 86, power source 90 and motor 73 are connected.

Therefore electric motor 73 rotates at a predetermined direction, and screw jack 71 becomes long.

As a result, moving wall section 60 is moved to providing section 76.

[0035]

When moving wall section 60 moves in providing position 76, it is detected by a sensor (not shown) and switching circuit 73 becomes "OFF", and motor 73 stops.

Coin amount detecting unit 80 can be changed to a photo electric sensor.

Also, before the operation, motor 73 is rotated in the counter direction by manual switch 94.

Therefore screw jack 71 becomes short, and moving wall section 60 is returned to the storing position 74.

[0036]

When moving wall section 60 returns to the storing position 74, a sensor (not shown) detects it, and switching circuit 92 becomes "OFF", and motor 73 stops.

Manual switching 94 can be changed to a second coin amount detecting sensor.

Therefore, when the coins on rotating disk 16 becomes at a predetermined amount, motor 73 is rotated in the counter direction, and moving wall section 60 is automatically returned to the storing section 74.

[0037]

The operation of first embodiment is explained.

Firstly, manual switch 94 is pushed, and moving wall section 60 is kept in storing position 74.

Before the operation starts, storing bowl 20 is filled by coins 36 through throwing opening

46.

Therefore coins 36 are stored in increasing area 96 of bucket 62.

[0038]

When a customer wins the game, a predetermined amount of coins are dispensed one by one from throwing exit 98 by rotating disk 16.

When there are coins 36 at a predetermined amount, in other words, when the current flows between first electrode 82 and second electrode 84, refilling direction circuit 88 does not output a refilling signal.

Therefore moving wall section 60 is kept in storing position 74.

[0039]

When coins 36 reduces, in other words, the current does not flow between first electrode 82 and second electrode 84, refilling detecting circuit 88 outputs refilling signal 86.

Switching circuit 92 becomes "ON" by refilling signal 86, and motor 73 is rotated.

Therefore screw jack 71 becomes longest, and moving wall section 60 is moved to providing position 76.

At the same time, coins 36 which is stored in increasing area 96 does not have contact with the fixed wall section.

Therefore the coins are not nipped by moving wall section 60 and the fixing wall section.

As a result, bucket 62 is not stopped.

[0040]

Therefore the stored coins 36 in increasing section 96 slide on moving wall section 60 towards rotating disk 16, and are dispensed by rotating disk 16.

Accordingly, the coins 36 are increased, and the refilling work is reduced.

Also, when a prior coin hopper is converted, the storing bowl is changed to the present invention's storing bowl 20 which includes moving wall section 60 and adds actuator 70 and the controlling circuit.

As a result, the conversion is inexpensive and easier.

[0041]

Next, second embodiment is explained as shown in figure 5.

In the second embodiment, electrical motor 73 for screw jack 71 is not used, and screw jack 71 is extended by an electrical motor for the coin hopper.

[0042]

One way clutch 102 is located on the transmitting system between the outputting shaft of motor 18 and second reducer 100.

Second reducer 100 and the worm gear of screw jack 71 are operatively connected.

When the output shaft of motor 18 rotates at a predetermined direction, one way clutch 102 does not transmit the power.

When the output shaft of motor 18 rotates opposite to the direction, one way clutch 102 drives the worm gear of screw jack 71 through second reducer 100.

[0043]

Therefore when coin amount detecting unit 80 does not detect the current, the motor 18 stops, afterwards it rotates in the counter direction.

By this counter rotation, screw jack 71 is driven through one way clutch 102 and second reducer 100.

Therefore moving wall section 60 is moved to providing position 76.

In this embodiment, before in the start, moving wall section 60 is returned to storing position 74 by motor 18 without one way clutch 102.

Also, on the way to moving of moving wall section 60 receives the dispensing signal, the dispensing signal is stored, afterwards the moving of the coins are dispensed based on the stored dispensing signal.

[0044]

Next third embodiment is explained referring to figures 6 and 7.

In the third embodiment, rotating disk 16 is located horizontally, and four moving wall sections 120, 122, 124, 126 are located around the disk 16.

As shown in figure 7, moving wall sections 120, 122, 124, 126 are used in bucket 128 as the same as the first embodiment.

Buckets 128 are moved to the storing position and the providing section by actuators 130.

The operation is the same as the first embodiment.

In the first embodiment and third embodiment, the moving wall sections are located at the middle wall section 54, however it can be located at perpendicular section 52.

[0045]

Next, fourth embodiment is explained referring to figure 8.

In this embodiment, moving wall section 140 is a concave shape, and at the providing section it moves straight as shown in an imaginary line.

In this embodiment, moving wall section 140 is made up of an elastic and can be located around rotating disk 16.

Also, actuator 142 can be made up of an elastic tube which is ring, and it provides compressed air and the moving wall section 140 is moved to providing section.

[0046]

Next, fifth embodiment is explained referring to figure 9.

In the embodiment, actuator 130 in the third embodiment is changed to an actuator 146 which is built in spring 144.

Actuator 146 includes rod 152 which is attached to slidable slider 150 by spring 144 in cylinder 148.

Bucket 128 is lifted up by rod 152, moving wall sections 120, 122, 124, 126 are moved from storing position 74 to providing position 76.

[0047]

Moving wall sections 120, 122, 124, 126 can be moved between storing position 74 and providing position 76 based on the weight of coins 36.

In other words, when the storing bowl 20 is full, many coins 36 are located on moving wall sections 120, 122, 124, 126.

Therefore bucket 128 pivots downwards by the weight of coins 36, and it moves to storing position 74 which is a solid line.

[0048]

When coins 36 in storing bowl 20 are reduced, bucket 128 is pivoted upwards by spring 144.

Therefore moving wall sections 120, 122, 124, 126 move to providing section 76, and coins 36 in bucket 128 are provided onto rotating disk 16.

[0049]

Also, when moving wall sections 120, 122, 124, 126 are moved by only spring 144, the coins 36 are thrown out from storing bowl 20.

A buffering unit is attached to rod 152.

Accordingly, moving wall sections 120, 122, 124, 126 are moved slowly.

[0050]

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1]

Fig. 1 is a perspective view of the coin hopper of the first embodiment.

[Fig. 2]

Fig. 2 is a cross section view of A plane of Fig. 1.

[Fig. 3]

Fig. 3 is a perspective view of the bucket of the first embodiment.

[Fig. 4]

Fig. 4 is a controlling block diagram of the actuator of the first embodiment.

[Fig. 5]

Fig. 5 is a driving system diagram of the second embodiment.

[Fig. 6]

Fig. 6 is a plane view of the third embodiment.

[Fig. 7]

Fig. 7 is a cross section view of B - B line of Fig. 6. [Fig. 8]

Fig. 8 is an explaining view of fourth embodiment.

[Fig. 9]

Fig. 9 is an explaining view of fifth embodiment.

[Description of the code]

16 rotating disk

20 storing bowl

36 coin

52, 54 wall section

60, 120, 122, 124, 126, 140 moving wall section

70, 130, 142, 146 actuator

74 storing position

76 providing section

80 coin amount detecting unit

86 refilling signal

[Document name] Drawing

[Fig. 1]

[Fig. 2]

[Fig. 3]

[Fig. 4]

[Fig. 5]

[Fig. 6]

[Fig. 7]

[Fig. 8]

[Fig. 9]

[Document name] Abstract document

[Abstract]

[Problem to be solved]

The first purpose of this invention is for the string amount of the storing bowl is increased.

The second purpose of this invention is so that the surface area does not increased.

The third purpose of this invention is to make it simple and inexpensive.

The fourth purpose of this invention is to make it adapts from a used coin hopper.

[Solution]

[Means for Solving the Problem]

A coin hopper comprises of;

a storing bowl which stores coins in bulk and includes a wall section,

a rotating disk which is located below the storing bowl for the coins,

a moving wall section which structures the wall section of the storing bowl and can move to a storing position or to a providing position; the coins do not slide towards the rotating disk in the storing position however they so slide towards the rotating disk in the providing position.

[Selection figure] Fig. 2

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